620 TRAFFIC SIGNING

620.01 TIMBER GROUND MOUNT SIGN POSTS

(A) DESCRIPTION. Work consists of furnishing, fabricating, and erecting all timber break-away type sign posts, and furnishing foundation sleeves for ground mounted signs shown in the contract documents.

(B) MATERIALS.

Timber Posts - 821.14(C)

Preservative - 811.09(C)

Post Sleeves shall be 12 gauge steel, galvanized in accordance with AASHTO M 111

Primer Sealer - 811.03(D)

Paint shall meet requirements of FS TT-P-71 and shall be tinted to match color No. 14109 of Federal Standard 595

(C) CONSTRUCTION REQUIREMENTS. Sleeves shall be set as part of PCC footing work. Posts shall be cut as indicated prior to the preservative treatment.

Treatment - Posts shall be given a pressure treatment by full cell process in accordance with AWPA Specifications C1 and C2. For Wolman-Salts, there shall be a final retention of not less than 0.55 pound of dry salt per cubic foot of wood. For Chromated Zinc Chloride, there shall be a final retention of not less than 1.15 pounds of dry salt per cubic foot of wood.

Samples of posts with their preservative coating shall be submitted before erection for the written approval of the Engineer.

Painting - Post shall be given one complete coat of primer sealer and one uniform coat of green paint. Erection shall not begin until paint is dry to heavy thumb pressure.

Erection - Posts shall be set in sleeves, the space between rim of sleeves and projection of posts shall be carefully cleaned and filled with joint sealant meeting requirements of FS TT-S-227, Class B. Sealant shall be tool finished smooth. Backing material for sealant shall be installed as directed.

(D) MEASURE AND PAYMENT. The unit of measure for Timber Ground Mount Sign Posts will be per linear foot.

Payment will be made at the contract unit price per linear foot, complete in place, which payment will include furnishing galvanized steel sleeves, sealant, cutting post tops and incidentals necessary to complete the work.

620.02 GUIDE SIGN PANELS, TRAFFIC SIGN PANELS, HAZARD MARKERS, EXTRA DEMOUNTABLE CHARACTERS, DELINEATORS

(A) DESCRIPTION. Work consists of furnishing, fabricating and erecting all guide sign panels, traffic sign panels, delineators, and hazard markers with reflectors required for the project, including all letters, numerals, symbols and characters, borders, reflective sheeting, reflector buttons, reflectors, and mounting hardware. Traffic signs shall mean all regulatory, warning, mile markers, and route marker assembly signs.

Panel faces shall be of following types:

Type A Sign Face - Illuminated sign with reflective background and with demountable characters and demountable borders with reflector buttons.

Type B Sign Face - Non-illuminated sign with reflective background and with demountable characters and demountable borders with reflective buttons.

Type C Sign Face - Non-illuminated sign with reflective background and with nondemountable characters and borders.

(B) MATERIALS.

Reflective Sheeting - 823.02

Sheets, Plates, Angles, Zees, Lock Tabs, Support Angles and Panel Hardware - 823.04

Insulation, Demountable Characters and Borders, Non-demountable Characters, Reflector Buttons, Hazard Markers, and Delineator Reflectors - 823.04

The Contractor shall submit manufacturer's certification in accordance with AASHTO M 290.

(C) CONSTRUCTION REQUIREMENTS. The types of sign faces, size of letters and messages shall be as specified in the contract documents. Guide sign borders shall be of the width and color specified and shall consist of the following:

1. Reflective sheeting for signs with non-demountable buttonless characters on a reflective background.

2. Reflective sheeting on a demountable border with properly spaced reflector buttons for those signs with demountable characters with reflector buttons.

Alternate details may be submitted for approval, for structural framing and brackets needed to mount sign panels to supports.

The Contractor shall furnish, for approval of the Engineer, complete shop drawings for guide signs showing panel assembly, stringer size and spacing, letter size, letter and word spacing, bracket and support spacing, type and color of message components, and sign face arrangement. Shop drawings for traffic signs are not required.

All panel fabrication, including cutting and punching or drilling of holes, shall be complete prior to metal degreasing and application of reflective sheeting. Metal panels shall be cut to size and shape and shall be free of buckles, warp, dents, cockles, burrs, and defects resulting from fabrication. The front surfaces of all sign panels shall be flat.

Guide sign panels shall be fabricated from standard width aluminum sheets of 0.125 inch thickness. Panels shall be made from sheets not less than 4 feet wide except that not more than 2 sheets for any one sign may be cut to less than 4 feet in width. Sign panel sections shall run from the top edge to bottom edge of the sign face without horizontal joints, except that in cases where sign height exceeds 12 feet, one horizontal joint may be used subject to the approval of the Engineer.

Each sign panel for traffic signs shall be cut from a single aluminum sheet to the size and shape

shown on the plans. Sheets may be sheared, blanked, sawed, or milled; no flame cutting will be permitted. Cut edges shall be true, smooth, and free from burrs or ragged breaks and panels shall show no deviation from flatness when examined from a distance of 20 feet. Mounting holes shall be punched or drilled.

Guide sign panels shall be provided with angles on the backface at the joints to hold the abutting panels firmly and in proper alignment. All sign panel fastenings, lock tabs, and aligning angles shall be applied in such a manner as to cause a minimum of projection of the sign face. Where lock tabs are not used, end panel sections shall be provided with hook-bolted connections to horizontal stringers to keep all panel sections tightly joined, and centered horizontally on the stringers. These hook-bolt connections shall not be visible from the sign face.

Backs of sign panel sections shall be provided with suitable fasteners to permit easy attachment to the supporting zee stringers. Stringers shall be fastened to the panels with aluminum or stainless steel bolts, nuts, and washers, or with extruded aluminum lock tabs. Lock tabs shall be fastened to the sign panels by spot welding or by counter-sunk head aluminum bolts. Aluminum bolts shall be used in strict accordance with the manufacturer's recommendations, subject to the approval of the Engineer. Two copies of the manufacturer's specifications and instructions for the bolts and type of aluminum used shall be delivered to the Engineer prior to use. Tubular stiffeners shall be provided with end flanges with the bolt holes where indicated on plans. Stiffeners shall be fastened to the zee stringers with bolts through the neutral axis of the zee section web.

Where aluminum comes in contact with steel other than stainless steel, a 1/16 inch thickness approved insulating material as specified herein shall be placed between the two members. This material shall be used in all cases whether indicated on the plans or not.

Field drilling of holes will not be permitted in any part of the structural assembly unless approved by the Engineer.

All welding of aluminum alloys, except spot welding, shall be performed by the inner-gas-shielded, tungsten or consumable-electrode method. Both the welding procedure and the welders shall be qualified in accordance with the requirements of ASME BOILER AND PRESSURE VESSEL CODE, SECTION IX. Three certified copies of the qualification test (Form Q-1, Form Q-1G and/or Form Q-1F whichever is applicable) as required by the above code, shall be properly completed and furnished the Engineer. All welds shall be neatly formed, and shall be free from cracks, blow holes, and other irregularities.

No field welding will be permitted on any part of the sign panel.

Type III high intensity reflective sheeting shall be used for all guide sign backgrounds. Type III, High Intensity, reflective sheeting shall be used for regulatory, warning, and all other traffic signs required during construction and furnished by the Contractor. Type III sheeting shall be used for all non-demountable characters without buttons.

Reflective buttons shall be attached to demountable characters and sign borders by mechanical means that require no adhesive, after which the demountable units shall be attached to sign panels with approved aluminum blind fasteners or self-tapping aluminum alloy sheet metal screws in accordance with manufacturer's recommendations.

Messages and characters shall be aligned and spaced in accordance with standard spacing guidelines of the Federal Highway Administration. Where Interstate Route Markers are required for guide signs using demountable characters, the route shields also shall be attached as demountable units.

Legends for regulatory, warning or other traffic signs shall be applied by the direct or reverse screening process. Legends shall be uniform in color, free from ragged edges, runs, drops and other faults affecting sign appearance. Copy registration shall be accurate. The finished screened area shall exhibit

uniform film thickness, hiding power and proper color and shall be satisfactory to the Engineer.

After application of the message, and when the paste has become thoroughly dry, traffic sign faces shall be coated with a full, glossy coat of finishing clear as supplied by the sheeting manufacturer. All finishing clear shall be applied in accordance with the manufacturer's recommendations, and shall be thoroughly dry before packaging.

Mile marker drive posts shall be placed at 1/10 mile intervals along both lanes of the main roadway where indicated on plans. Mileage numbers shall be started from a reference point determined by the Engineer, and shall be continuous on any one roadway. Where a project is continuation of a previously completed roadway, the Engineer will determine the location of the starting marker for the project, and the mile marker number from which the remaining numbers shall be counted. Where an interchange roadway or other interference prevents correct location, it may be moved not more than 50 feet, or omitted as directed.

All guide, regulatory, warning, or other traffic sign panels and hazard markers damaged as a result of the Contractor's operations shall be restored to their original condition or be replaced by the Contractor at his own expense, to the satisfaction of the Engineer.

Prior to final acceptance of the work, an inspection will be made of the sign site at night by the Engineer. If specular reflection is apparent on any sign, the sign panel shall be adjusted by the Contractor at his sole expense to eliminate this condition.

(D) MEASURE. The unit of measure will be the square foot of sign panel face or traffic sign face mounted in place. The unit of measure for hazard markers will be per each hazard marker sign panel complete with reflectors and mounted in place. The unit of measure for delineators will be per each mounted in place. Unit of measure for Extra Demountable Characters will be the square foot with measure taken based upon the area of smallest rectangle from which each character may be cut.

(E) PAYMENT. Payment for Guide Sign Panels and Traffic Sign Panels will be made at the contract unit price per square foot and for Hazard Markers per each, which payment will include furnishing, fabrication, erection, reflective sheeting, reflectorized demountable characters, non-demountable characters, silk screening, finishing clear, reflectorized borders, mounting brackets and hardware, final adjustments and all labor, tools, materials, equipment, and incidentals necessary to complete the work.

Payment for Delineators will be made at the contract unit price per each, which payment will include all labor, tools, materials, equipment, and incidentals necessary to complete the work.

Payment for Extra Demountable Characters will be made at the contract unit price per square foot, which payment will include the character complete with reflective sheeting and reflector buttons, as required, and mounting hardware.

620.03 FEDERAL AID PROJECT SIGN

(A) GENERAL. The Contractor shall furnish, erect, maintain and remove as directed by the Engineer one Federal-Aid Project Sign at each end of the project under construction as shown on the detailed drawing included in the contract documents. Cost figures for insertion on signs, rounded to the nearest $1,000.00, will be provided by the Engineer. The Engineer will provide the name of the construction project and the U.S. Route number if any.

The sign shall be 4' X 8' X 3/4" - exterior plywood, smooth sanded on one side. The sign will be mounted on three 4" x 4" x 12' posts (or approved alternate) at location(s) designated by the Engineer. The sign face shall be painted with three (3) coats of outdoor white enamel; sign rear with one (1) coat of same enamel. Lettering shall be of silk screen enamels; black for all lettering; crimson red for the D.C. Logo.

(B) MEASURE. The unit of measure for FEDERAL AID PROJECT SIGN will be per each sign furnished for the contract.

(C) PAYMENT. Payment for FEDERAL AID PROJECT SIGN will be made at the contract unit price per each, which payment will include labor, materials, equipment and incidentals necessary to furnish, erect, maintain and remove the sign.

620.04 REFLECTIVE SHEETING

(A) DESCRIPTION. Work consists of furnishing and installing all reflective sheeting for the various signs, characters and markers on the project, as shown in the contract documents and as specified herein.

(B) MATERIALS.

Reflective Sheeting (Type III) - 823.02

Adhesive - 823.02
Finishing - Clear liquid finishing agent as specified by reflective sheeting manufacturer.

(C) CONSTRUCTION REQUIREMENTS. Construction shall meet the following requirements:

Aluminum Surface Preparation - Prior to application of reflective sheeting to sign panels, traffic signs, and markers, panels shall be completely fabricated and the contact surfaces shall be degreased and etched as follows:

Vapor Degreasing - Clean panels with trichloroethylene vapor. Trademark printing shall be removed with a lacquer thinner or controlled alkaline cleaning system.

Alkaline Degreasing - As an alternate to vapor degreasing, clean by total immersion of panel in a tank containing alkaline solutions, controlled and titrated to manufacturer's specification. Immersion time shall depend upon the amount of grease present and gauge of panel. Pieces shall be rinsed thoroughly with running clean water.

Acid Etch - Etch precleaned panel in a 6-8 percent by volume phosphoric acid solution at 100°F or in a proprietary acid etching solution. Pieces shall be rinsed thoroughly with running, clean water, which may be followed by a hot water rinse.

Alkaline Etch - As an alternate to acid etch, etch precleaned panel in an alkaline etching solution controlled and titrated to manufacturer's specifications. Pieces shall be rinsed thoroughly with clean, running water. Smut shall be removed with an acidic chromium compound type solution as specified by manufacturer and then the surfaces rinsed thoroughly.

Drying - Dry surfaces by use of forced hot air.

Panels shall not be handled except by device or clean canvas gloves between all cleaning and etching operations and the application of reflective sheeting. There shall be no opportunity for panels to come in contact with greases, oils or other contaminants prior to the application of reflective sheeting.

Reflective Sheeting Application - Sheeting shall be applied to properly treated panel surfaces with mechanical equipment in an applicator under heat and pressure in a manner specified by the sheeting manufacturer.

Sign faces comprising 2 or more panels of reflective sheeting shall be carefully matched for color at time of sign fabrication to provide uniform appearance and brilliance, both day and night. Alternate successive width sections of sheeting shall be reversed and consecutive to insure that corresponding edges of sheeting lie adjacent on finished sign. Non-uniform shading and undesirable contact between adjacent widths of applied sheeting will not be permitted.

Patched sheeting shall not be permitted.

Finish - After application of sheeting, signs with demountable characters and borders shall be coated with a full, glossy coat of finishing clear. Signs with non-demountable messages shall be clear coated after application of messages and borders. Finishing clear shall be applied by spraying, roll coating, or screen processing in a manner recommended by sheeting manufacturer.

Signs with screen processed messages and borders shall be clear coated after application of message.

(D) MEASURE AND PAYMENT. There shall be no direct measure.

Payment for Reflective Sheeting will be included in the contract price respectively for the appropriate Guide and Traffic Sign Panels and Hazard Markers.